

CLAIMS

What is claimed is:

1 1. A method for atomically updating an original portion of platform firmware
2 data, comprising:
3 writing updated firmware data that is to replace the original portion of platform
4 firmware data to a firmware storage device; and
5 atomically modifying firmware configuration data to indicate the updated
6 firmware data is to be used in place of the original portion of platform firmware data
7 that is being updated such that only all of the original portion of platform firmware
8 data are valid prior to the atomic modification of the firmware configuration data and
9 only all of the updated firmware data are valid after the atomic modification to the
10 firmware configuration data.

1 2. The method of claim 1, further comprising performing an integrity check of
2 the updated firmware data to verify that the updated firmware data is valid.

1 3. The method of claim 1, wherein the updated firmware data is written to the
2 firmware storage device in a manner in which the updated firmware data is invisible
3 to a firmware management system used to access firmware data stored on the
4 firmware storage device until the atomic modification of the firmware configuration
5 data has been made.

1 4. The method of claim 1, further comprising enabling a full recovery of the
2 original portion of firmware data that is to be updated during an upgrade process in
3 response to a system anomaly that prevents completion of the upgrade process.

1 5. The method of claim 1, further comprising deleting the original portion of
2 platform firmware after it has been upgraded.

1 6. The method of claim 1, wherein the original platform firmware data and the
2 updated firmware data respectively comprise one or more firmware files, each
3 firmware file including header data that are modified during the update process to
4 track a current state of that file.

1 7. The method of claim 6, wherein the original platform firmware data
2 comprising multiple firmware files and each firmware file further includes a
3 respective data area, the method further including:
4 creating a first file having a header and a data area;
5 writing the updated firmware data as multiple files to the data area of the first
6 file, each file that is written including a respective header and data area in which
7 updated firmware data for that file is contained;
8 modifying data in headers of firmware files corresponding to the original
9 portion of platform firmware data to indicate these firmware files are to be updated;
10 and
11 modifying data in the header of the first file to simultaneously invalidate each
12 of the original firmware files and validate each of the updated firmware files.

1 8 The method of claim 1, wherein the firmware storage device comprises a
2 flash memory device.

1 9. A method for atomically updating a plurality of original platform firmware files,
2 comprising:
3 creating a temporary file;

4 writing data corresponding to a plurality of updated platform firmware files
5 comprising new versions of the plurality of original platform firmware files to the
6 temporary file; and

7 atomically modifying platform firmware file configuration information to
8 indicate that the updated platform firmware files are to be used in place of the
9 original platform firmware files such that only all of the original platform firmware files
10 or only all of the updated platform firmware files are valid at any point in time during
11 an update process.

1 10. The method of claim 9, wherein each platform firmware file comprises a file
2 header and a data area in which platform firmware data corresponding to that file is
3 written, and wherein each file header includes a plurality of state bits that are used
4 to track a current state of each platform firmware file during the update process.

1 11. The method of claim 10, wherein the temporary file is created by creating a
2 file header that identifies the temporary file includes a data area that is sized to hold
3 all of the updated platform firmware files, said data area being mapped to a memory
4 area on a firmware storage device that is used to store the original and updated
5 platform firmware files.

1 12. The method of claim 11, further comprising changing a state bit in the
2 temporary file's file header to indicate that the temporary file is invalid after data
3 corresponding to the updated platform firmware files are written to the data area of
4 the temporary file.

1 13. The method of claim 12, wherein a file system is used to access the platform
2 firmware files and the updated firmware files appear invisible to the file system prior

3 to when the state bit is changed and become visible to the file system after the state
4 bit is changed.

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1 14. The method of claim 13, wherein each original platform firmware file has a
2 name that is shared by a corresponding updated platform firmware file, further
3 comprising:

4 changing the state bits in each of the original platform firmware files to
5 indicate they are to be updated;

6 setting the state bits in each of the updated platform firmware files to indicate
7 that they are valid,

8 wherein, upon becoming visible to the file system, the state bits in the file
9 headers of the updated platform files in combination with the state bits in the original
10 platform firmware files simultaneously inform the file system that the original
11 platform files are invalid and the updated platform files are valid.

1 15. The method of claim 9, further comprising performing an integrity check of
2 the updated platform firmware files to verify that the updated firmware files are valid
3 prior to atomically modifying the platform firmware file configuration information to
4 indicate that the updated platform firmware files are to be used in place of the
5 original platform firmware

1 16. The method of claim 9, further comprising enabling a full recovery of the
2 original platform firmware files that are to be updated during the upgrade process in
3 response to a system anomaly that prevents completion of the upgrade process.

1 17. The method of claim 10, further comprising setting the state bits in each file
2 header of the original platform firmware files to indicate the file is deleted after the
3 upgrade process has been complete.

1 18. A machine readable media on which a plurality of machine-executable
2 instructions are stored that when executed by a machine atomically updates an
3 original portion of platform firmware data partitioned into a plurality of sets of
4 firmware code by performing the operation of:

5 writing updated firmware data that is to replace the original portion of platform
6 firmware data to a firmware storage device; and

7 atomically modifying firmware configuration data to indicate the updated
8 firmware data is to be used in place of the original portion of platform firmware data
9 that is being updated such that only all of the original portion of platform firmware
10 data are valid prior to the atomic modification of the firmware configuration data and
11 only all of the updated firmware data are valid after the atomic modification to the
12 firmware configuration data.

1 19. The machine readable medium of claim 18, wherein execution of the plurality
2 of machine instructions further performs the operation of performing an integrity
3 check of the updated firmware data to verify that the updated firmware data is valid.

1 20. The machine readable medium of claim 18, wherein execution of the plurality
2 of machine instructions further enable the machine to perform a full recovery of the
3 original portion of firmware data that is to be updated during an upgrade process in
4 response to a machine anomaly that prevents completion of the upgrade process.

1 21. A machine readable media on which a plurality of machine-executable
2 instructions are stored that when executed by a machine atomically updates a
3 plurality of original platform firmware files by performing the operations of:
4 creating a temporary file;
5 writing data corresponding to a plurality of updated platform firmware files
6 comprising new versions of the plurality of original platform firmware files to the
7 temporary file; and
8 atomically modifying platform firmware file configuration information to
9 indicate that the updated platform firmware files are to be used in place of the
10 original platform firmware files such that only all of the original platform firmware files
11 or only all of the updated platform firmware files are valid at any point in time during
12 an update process.

1 22. The machine readable media of claim 21, wherein each platform firmware file
2 comprises a file header and a data area in which platform firmware data
3 corresponding to that file is written, and wherein each file header includes a plurality
4 of state bits that are used to track a current state of each platform firmware file
5 during the update process.

1 23. The machine readable media of claim 22, wherein the temporary file is
2 created by creating a file header that identifies the temporary file includes a data
3 area that is sized to hold all of the updated platform firmware files, said data area
4 being mapped to a memory area on a firmware storage device that is used to store
5 the original and updated platform firmware files.

1 24. The machine readable media of claim 23, wherein execution of the plurality of
2 machine instructions further performs the operation of changing a state bit in the file

header of the temporary file to indicate that the temporary file is invalid after data corresponding to the updated platform firmware files are written to the data area of the temporary file.

25. The machine readable media of claim 24, wherein a file system is used to access the platform firmware files and the updated firmware files appear invisible to the file system prior to when the state bit is changed and become visible to the file system after the state bit is changed.

26. The machine readable media of claim 25, wherein each original platform firmware file has a name that is shared by a corresponding updated platform firmware file, and wherein execution of the plurality of machine instructions further performs the operations of:

- changing the state bits in each of the original platform firmware files to indicate they are to be updated; and
- setting the state bits in each of the updated platform firmware files to indicate that they are valid,

wherein, upon becoming visible to the file system, the state bits in the file headers of the updated platform files in combination with the state bits in the original platform firmware files simultaneously inform the file system that the original platform files are invalid and the updated platform files are valid.

27. The machine readable media of claim 21, wherein execution of the plurality of machine instructions further performs the operation of performing an integrity check of the updated platform firmware files to verify that the updated firmware files are valid prior to atomically modifying the platform firmware file configuration information

5 to indicate that the updated platform firmware files are to be used in place of the
6 original platform firmware.

1 28. The machine readable media of claim 21, wherein execution of the plurality of
2 machine instructions further performs the operation of enabling a full recovery of the
3 original platform firmware files that are to be updated during the upgrade process in
4 response to a system anomaly that prevents completion of the upgrade process.

1 29. The machine readable media of claim 22, wherein execution of the plurality of
2 machine instructions further performs the operation of setting the state bits in each
3 file header of the original platform firmware files to indicate the file is deleted after
4 the upgrade process has been complete.

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